New President

THE Rockefeller University, situated on a small sylvan campus in the Sixties toward the East River, was founded by John D. Rockefeller, Sr., in 1901 as the Rockefeller Institute for Medical Research. Its name was changed to The Rockefeller Institute in 1958 and to The Rockefeller University in 1965. Since its founding, it has been headed by five men—each of the first two, Dr. Simon Flexner and Dr. Herbert S. Gasser, being known simply as the director. The title of president was established in 1953 and was first held by the late Dr. Detlev Bronk, who was a sort of scientific polymath, and under whose direction the institute was transformed into a university granting Ph.D.s (there are no undergraduates) in the life sciences and related behavioral and physical sciences. He was succeeded in 1968 by Dr. Frederick Seitz, a distinguished physicist, who retired from the post last June. *His* successor had been named in January. He is Dr. Joshua Lederberg, one of the leading contemporary geneticists. Lederberg was awarded the Nobel Prize for Physiology and Medicine in 1958, at the age of thirty-three, for work he had begun as an undergraduate at Columbia College, when he was only eighteen. The Rockefeller University has had a veritable galaxy of Nobel Prize winners on its remarkable faculty, so it seems fitting that its new president is, as far as we have been able to learn, the only Nobel Prize winner who is now the president of a university.

Being eager to have a talk with such a distinguished newcomer, we arranged to call on him in his office not long after he and his family moved to the city from Stanford, where he had been the chairman of the Department of Genetics at the Stanford University School of Medicine. (His wife, Marguerite, is an M.D. who worked in pediatrics and then in psychiatry at Stanford, and she plans to continue her psychiatric practice here; they have a four-year-old daughter, Annie.) Dr. Lederberg is a man of medium height, with a broad, open face bounded below by a full white beard, and after only a few minutes of conversation his enthusiasm for science, and for scientific discovery, becomes evident.

Dr. Lederberg told us he was born in Montclair, New Jersey, but when he was six months old his father, an Orthodox rabbi, moved to Washington Heights. The son, growing up there, was educated in the public-school system: at P.S. 46, on Eighth Avenue at 155th Street; Junior High School 164, on West 164th; and Stuyvesant High School, on East Fifteenth, which specializes in science and mathematics. At the age of sixteen, he entered Columbia. "My earliest interests were in the physical sciences," he said. "I acquired the notion that there was an order in the world and that one could not rely on revealed knowledge—rather, that man was on the earth to grub and find out for himself what the universe was all about. I was very much influenced by writers like Jeans and Eddington, and their cosmological popularizations.

Albert Einstein and Chaim Weizmann were culture heroes both of the time and of my particular culture group. For my father, it was a bit of a wrench to see me go in such a secular direction, but it was the best compromise possible between his views and my own." By the time Lederberg entered Columbia, his interest had shifted in the direction of the application of science to human problems—in particular, to biological and biomedical problems. What happened next is a remarkable example of how scientific discoveries are made.

In his second year at Columbia, Lederberg came under the tutelage of a young instructor in zoology, Francis Ryan, who encouraged the bookish science student to familiarize himself with practical laboratory techniques. Ryan had just returned to Columbia from Stanford, where he had worked with George Beadle and Edward Tatum—two geneticists who, as it happened, later shared the Nobel Prize with the much younger Lederberg. Beadle and Tatum had invented a method of nutritional genetic marking to trace mutations in fungi and bacteria. In some respects, such organisms are better off than we are; for one, they manufacture many of the chemicals—like vitamin B—that they need for their own metabolism, while we have to ingest them, directly or indirectly, from plants. But if one produces, say, a mutant strain of bacteria with a metabolic deficiency, the new strain must be supplied with the appropriate growth factor to keep it alive and reproducing. In this way, mutations and their biochemical characteristics can be traced by seeing the changes in the bacteria's nutritional needs. It seems a simple idea now, but it revolutionized laboratory genetics, and Ryan taught this technique to Lederberg.

In 1944, while Lederberg was still at Columbia, O. T. Avery and two younger colleagues, Colin MacLeod and Maclyn McCarty, at what was then The Rockefeller Institute for Medical Research, published a now classic paper suggesting that DNA was the active agent that caused genetic transformation. They worked on strains of pneumococcus, and their results were not universally accepted. But here in New York, Lederberg recalled, their paper set the young biologists "on fire." Lederberg thinks that if he had not been here and had not had contact with people who were working with Avery he might not have begun to think about how to explore the possibilities that DNA opened up right from the beginning. He and Ryan began by doing experiments on spores of a mutant strain of a fungus in the hope of seeing whether DNA would influence a "back mutation" to the wild form. Their use of nutritional markers was so sensitive that they could detect a mutation rate of less than one in a billion. But, because they found that such mutations occurred whether or not DNA was added, they could not draw any conclusions about the specific role of DNA in this system.

By this time, it was 1945. Lederberg had entered Columbia's medical school, and while a full-time medical student he was moonlighting in Ryan's laboratory. He recalls that in his first lecture on bacteriology the class was told that bacteria had no "sexual" behavior and therefore very little was known about their genetic structure. Right there and then, he told us, he wrote down in his notebook an experimental procedure, along the lines of what he and Ryan were doing with the fungus, to test this statement. Here the idea was to take two mutant strains of bacteria, each of which required one specific vitamin that it was unable to synthesize. One would put the mutants together in a medium that lacked these vitamins, and see if any colonies of bacteria developed. The presence of such colonies would show that some of the bacteria had combined to form new strains, lacking any metabolic deficiency. After two years at medical school, Lederberg learned from Ryan that *his* teacher Tatum was starting a new program at Yale in microbiology, and Lederberg joined it in 1946—leaving clinical medicine, as it turned out, for good. At Yale, he carried out, with Tatum, the experiments he had outlined in his notebook, and discovered that in fact bacteria can recombine, and do have a sort of sexual polarity. "I was, at the time, sufficiently cagey about the phenomenon not to use the terms 'male' and 'female' bacteria, so I called the two types 'F-plus' and 'F-minus,'" Dr. Lederberg told us. "It now appears that one sexual type of bacteria has tiny hollow hairs, which act as a conduit for the transfer of DNA between two bacteria." It was for this fundamental discovery of genetic recombination in bacteria that Lederberg shared the Nobel Prize.

In 1947, Lederberg migrated westward—first to the University of Wisconsin and eventually to California—in 1959, when Stanford University moved its medical school to the Palo Alto campus. Tatum himself moved to Rockefeller in 1957, and remained there until his death, in 1975, so Lederberg's coming from Stanford to Rockefeller to accept his new appointment makes a closing of the circle.

"New York played a special role in my scientific career," Lederberg told us. "It was, and is, a communications network. New York is a super-university. Evolutionists will tell you that you get the most rapid diversification of species where you have an archipelago—where you have islands that are not totally isolated from one another but have sufficient isolation so that each one can develop its distinctive flavor and sufficient communication so that there is some gene flow between them. That's how I'd characterize the intellectual environment of the city, and I want to help our university and the other universities here to use our resources as coöperatively as we can."